2003 Annual Report

South Carolina's Nonpoint Source Pollution Management Program

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WHAT IS NONPOINT SOURCE POLLUTION?

Nonpoint source (NPS) water pollution, unlike pollution from industrial and sewage treatment plants, comes from many different sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground (runoff). As runoff moves, it picks up and carries away a variety of pollutants, finally depositing them into streams, lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water. These pollutants include:

- Excess fertilizers
- Pesticides from agricultural lands and residential areas
- Oil, grease, and toxic chemicals from urban runoff and energy production
- Sediment from improperly managed construction sites, crop lands, forest lands, and eroding streambanks
- Bacteria and nutrients from livestock, pet wastes, parking lots and roadsides
- Faulty septic systems

Atmospheric deposition and hydrologic modification also contribute to nonpoint source water pollution.

States report that nonpoint source pollution is now the leading cause of water quality problems. The effects of nonpoint source pollutants on water vary and may not always be fully assessed. However, we know that these pollutants have harmful effects on drinking water supplies, recreation, fisheries and wildlife. Beach closures, destroyed habitat, unsafe drinking water, fish kills, and many other severe environmental and human health problems result from NPS pollutants. Pollutants also ruin the beauty of healthy, clean water habitats. Each year, the United States spends millions of dollars to restore and protect the areas damaged by NPS pollutants

The United States has made tremendous advances in the past 25 years to clean up the aquatic environment by controlling pollution from industries and sewage treatment plants. Unfortunately, we did not do enough to control pollution from nonpoint sources. Today, NPS pollution remains the nation's major cause of water quality problems. It is the main reason that approximately 40 percent of our surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming.

Fifteen years ago, the federal government began to seriously address NPS pollution. Recent NPS control programs include the Nonpoint Source Management Program established by section 319 of the 1987 Clean Water Act Amendments, and the section 6217 Coastal Nonpoint Pollution Program under the 1990 Coastal Zone Act Reauthorization Amendments. These programs require states to address their own NPS pollution problems and to develop a strategy to control and prevent the pollution. Further, the section 319 programs provide annual funding so states can implement their strategy.

Experience has shown that by using a watershed approach, NPS programs can focus more effectively on cleanup. Also, use of the watershed approach has helped communities and citizens address

water quality problems caused by NPS pollution. The watershed approach not only looks at a water body, but also the entire area that drains into it. This allows communities to focus resources on a watershed's most serious environmental problems, which in many instances are caused by NPS pollution.

Citizens also need to modify their lifestyles to reduce and prevent NPS pollution on their own properties. Common sense techniques such as proper disposal of contaminating substances like drain oil, pesticides, pet wastes, and household chemicals, judicious use of fertilizers, and water conservation go a long way to reduce NPS pollution. Many residents practice recycling and participate in stream walks, beach cleanups, and other environmental activities sponsored by community-based organizations. By helping out, citizens can help address the nation's largest water quality problem, and ensure that even more of our rivers, lakes, and coastal waters become safe for swimming, fishing, drinking, and aquatic life.

ABOUT THE SOUTH CAROLINA NPS MANAGEMENT PROGRAM

To address nonpoint source water pollution in South Carolina, a comprehensive management strategy was developed and implemented by the state beginning in the early 1990s. In 1999, the strategy was revised and updated to reflect new goals and programs, and to provide a more focused approach to cleanup. During 2003, the South Carolina Department of Health and Environmental Control, with the cooperation of other agencies, organizations, and a variety of stakeholders, actively implemented this recently revised and updated control strategy via the *South Carolina Nonpoint Source Management Program.* This program fulfills the requirements of section 319 of the Clean Water Act **and** section 6217 of the Coastal Zone Act Reauthorization Amendments, two federal laws with nonpoint source provisions.

The 1999 *South Carolina Nonpoint Source Management Program* outlines the state's strategic plan for addressing statewide water quality impairments attributable to nonpoint source pollution. The Update lists 20 overall, long-term NPS management program goals for the fifteen-year period of 1999 through 2013. Each of the long-term goals is backed by a series of five-year action strategies that serve to implement these goals. Many of the action strategies are in turn implemented through a series of milestones, most of which are components of section 319 funded projects. The state's NPS Management Program is two-pronged, focusing on reducing NPS impacts in priority watersheds, and also implementing activities statewide to reduce and prevent NPS pollution. Components include both regulatory and voluntary approaches.

To facilitate success in achieving water quality improvements, South Carolina's NPS program focuses on impaired waterbodies as indicated on the 303(d) list in priority watersheds. The state's Coastal Nonpoint Pollution Control Program under Federal Coastal Zone Management legislation is also being implemented. Further, the state has begun developing and implementing NPS-related Total Maximum Daily Loads (TMDLs).

Technology based controls, a.k.a. management measures or best management practices, are employed to address NPS categorical impacts. The Management Plan Update describes specific management measures for each category as well as implementation schedules. South Carolina has the legal authority to implement all necessary management measures.

The South Carolina Department of Health and Environmental Control is responsible for Program implementation, but it depends on the cooperation of all levels of government in the state, private sector stakeholders, and especially the citizens of the state in order to realize positive results. Many organizations have expertise that is beneficial to the NPS pollution management program. For example, trade and environmental organizations have in-place delivery mechanisms that reach people capable of implementing NPS controls. These partnership roles are described in the Update.

A system of evaluation and monitoring techniques is a necessary component of the NPS Management Program, in order to judge its progress and success. Evaluation will show whether the Program is attaining the state's overall water quality vision, stated long-term goals, and five-year action strategies. In South Carolina's Program, several monitoring and tracking efforts are described that address available information on improvements in water quality, implementation milestones, and available information on reductions in NPS pollution. Evaluation techniques include water quality monitoring, tracking management measure implementation, and stakeholder feedback.

The NPS Management Program incorporates the nine key elements that are described in Environmental Protection Agency NPS guidance. Through the use of a framework that addresses these key elements, South Carolina will continue to have an effective NPS program that is designed to achieve and maintain beneficial uses of water.

IMPLEMENTING THE STRATEGY

South Carolina is taking full advantage of the Clean Water Act section 319 funding that is available from the Environmental Protection Agency (EPA) to prevent and reduce NPS water pollution in the state. The annual grant and resulting work plan is the principle funding mechanism for implementing the goals of the NPS Management Program. All projects described in the work plan are linked to one or more of the goals described in the NPS Management Program. In order to meet the goals of the NPS Management Program, emphasis shifted in the last several years toward implementing projects that address specific NPS impairments in priority watersheds. In fiscal year 2003, in accordance with the latest guidance from EPA, South Carolina began focusing resources on watersheds where nonpoint source Total Maximum Daily Loads (TMDLs) have been developed.

While section 319 grant funds provide significant revenue for implementing the NPS Management Program, it is actually much broader in scope. There are a variety of other programs including enforceable mechanisms that are applied to NPS pollution prevention. Within DHEC, several regulatory programs are administered including agricultural animal facility permitting and compliance, erosion and sediment control permitting and compliance, municipal and industrial

facility NPDES storm water permitting, state water quality standards and Pollution Control Act compliance, section 401 certification for wetlands disturbance and hydrologic modification, and onsite wastewater system standards and permitting.

Another significant source of funding for nonpoint source projects is a state and federally supported low interest loan program known as the State Revolving Fund (SRF). The SRF may be preferred by local governments for large budget projects since more funds are available than through the section 319 grant program.

The 1997 update to the NPS Management Program plan incorporates South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP) under section 6217 of the Coastal Zone Act Reauthorization Amendments. The purpose of the CNPCP is to address nonpoint source pollution issues within the coastal zone and ensure that all applicable management measures are implemented to protect and restore the state's coastal resources.

In April of 2001, the National Oceanic and Atmospheric Administration conditionally approved the state's CNPCP with one remaining condition. That condition relates to the vertical separation distance between an onsite sewage disposal system's drain field and the seasonal high water table. South Carolina continues to address this issue and is actively working to satisfy the remaining requirements needed for full program approval by NOAA and EPA. DHEC's Office of Ocean and Coastal Resource Management prepared a 15-year strategy for the CNPCP, which describes general objectives for the comprehensive and effective management of polluted runoff within the coastal zone.

Stakeholders play an integral part in the state's NPS strategy. Federal agencies such as the US Department of Agriculture Natural Resource Conservation Service (NRCS), Farm Service Agency (FSA), US Forest Service (USFS), and United States Geological Survey (USGS) have major roles. State agencies with complementary programs include the Department of Natural Resources, Clemson Extension Service, and the Forestry Commission. Non-profit groups such as the SC Wildlife Federation, Sierra club, and SC Coastal Conservation League, and industry trade organizations like the Farm Bureau, SC Assoc. of Conservation Districts, Cattlemen's Association, and the Forestry Association are also active participants.

In fiscal year 2003, South Carolina's section 319 grant work plan contains projects funded under two different EPA defined categories: annual and incremental. The annual allocation of approximately $1.5 million is used to implement projects that address NPS pollution with activities and programs that are statewide, while the incremental allocation of $1.5 million is used to implement nonpoint source TMDL projects in designated priority watersheds (see following articles for more details on TMDLs). The total amount of the funds are put into a work plan project and allocated periodically for specific implementation projects.

The list of approved NPS TMDLs (mostly for fecal coliform bacteria) currently tops 40, and is constantly growing as more and more are finalized. Cooperating agencies and organizations throughout the state are becoming very involved in the implementation process. One or several can jointly implement projects in a given watershed

using the section 319 funds. Projects to be implemented by outside agencies and organizations are selected using a competitive proposal process. The Request For Proposals (RFP) is promulgated several times per year through various meetings, workshops, Web sites, mailings, and advertisements in the publication *South Carolina Business Opportunities*, a biweekly publication with wide circulation.

Applicants must follow specific guidelines, which are published on the DHEC Web site (www.scdhec.gov/water) to develop a proposal. Only watersheds with approved TMDLs are eligible for projects. The proposed project must implement the TMDL and the objective must be to reduce the pollutant load so as to allow streams in the watershed to meet water quality standards. The guidelines specify that the project must address the eight elements of a well-designed watershed project as specified by the EPA. For 2003, the guidance was modified to allow projects that both develop and implement a TMDL.

Proposals received as a result of an RFP are reviewed and selected by a seven-member review committee. A proposed project must meet all of the criteria described above to be selected for funding. A maximum of $300,000 in federal funds per project is allowed unless the project covers two or more adjacent watersheds. The federal funds must be matched with at least 40 percent in non-federal funds. Combining funding from other sources such as USDA EQIP funds is encouraged.

In the FY 2003 work plan, annual allocation projects (1-6 and 8) are statewide or regional in scope and continue to institutionalize the state's nonpoint source program. Many of these projects address various nonpoint source categories including forestry, urban runoff, animal agriculture, wetlands, construction and groundwater impacts. Annual allocation category projects are implemented by SC DHEC staff (1-6) and the SC Forestry Commission (8). A significant portion of the annual allocation is used for NPS education and outreach, NPS monitoring, watershed management, compliance, and TMDL development. It is also used to continue implementation of a statewide forestry BMP compliance program.

Federal guidance allows for a maximum of 20 percent of the funding allocation to be used for assessment activities, including TMDL development. This work plan contains two assessment projects, numbers one and four. Project #4 includes funding for TMDL development work.

MEETING THE GOALS OF THE PROGRAM

The SC NPS Management Program document describes 17 long-term goals and guiding principals that facilitate and promote the state's efforts to manage NPS water pollution. The goals are scheduled to be attained within a 15-year period beginning in 1999. To assure attainment, several quantifiable five-year action strategies were developed and described. Each set of strategies includes a short-term goal, the implementing mechanism, the implementing agency(s), and a reference to the antecedent long-term goal. Many of the action strategies are in turn supported by milestones, which are associated with implementation of section 319 projects.

The Environmental Protection Agency reviews and critiques South Carolina's nonpoint source program twice each year. The FY 2003 mid-year report cited significant progress in the attainment of several of the goals. Among the comments, EPA said, "The state continues to have a proactive TMDL program (goals 4, 5, and 7). South Carolina TMDLs are incorporating the watershed approach. The primary pollutant targeted is fecal coliform. The state is selecting large watersheds, including all tributaries, for TMDL development. The state is currently using section 319 grant funds for contract development of TMDLs. The contract is funding development of 120 TMDLs addressing fecal coliform and other pollutants in South Carolina's priority watersheds over a period of three years. South Carolina has incorporated the TMDLs into its current continuing planning process (CPP) required under Section 303(e) of the Clean Water Act. This CPP is Web-based, www.scdhec.gov/water/ and the Web page contains links to TMDLs and other TMDL components. South Carolina has put all approved TMDLs, draft TMDLs, and their section 303(d) list on their Web site. In addition, the site contains permanent data solicitation for the section 303(d) list and it is updated regularly by state staff. South Carolina has effectively used section 319 funds to implement developed TMDLs. To date, South Carolina has successfully begun implementing 10 TMDLs in four watersheds."

Currently, the state is on track toward meeting interim milestones and strategies that lead to full attainment of the long-term goals by the specified deadline. The current status of several of these long-term goals is described below.

Goal one addresses assessing water quality and other factors to identify NPS impacted problem areas so that management solutions can be implemented (see **"NPS Monitoring Team Efforts Support Management Strategy," "Assessment of NPS Pollution Problems in Kingston Lake Watershed Finds Surprising Results"** and **"South Carolinians Still Cloudy on Runoff Behavior"**).

Goal two requires that all applicable management measures to protect and restore the state's coastal waters are in place within 15 years. To accomplish this goal, the state, through DHEC's Office of Ocean and Coastal Resources Management (OCRM), is implementing South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP) as required by section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA). For more information, see **"South Carolina's Coastal Nonpoint Pollution Control Program."** Currently, the Program has conditional approval from NOAA and the EPA. Only one condition remains, pertaining to on-site disposal system (OSDS), drainfield and seasonal high water table separation distances. During 2003, DHEC's Bureau of Environmental Health developed revised regulations to increase the vertical separation distance between the bottom of the drainfield to the seasonal high water table from six inches to twelve inches, and to increase the minimum horizontal setback of the drainfield and the nearest drinking water well from 50 to 75 feet. The SC DHEC Board approved the regulations and the public was given opportunity to comment. The proposed regulation was then submitted for a vote to the SC Legislature subcommittee, but it was disapproved. This means there is no chance for the regulations to become effective during 2003. The conditionally-approved CZARA Program expired on February 23, 2003. Currently, SC DHEC is designing a study that will determine if present and/or proposed separation distances protect surface water and wells. The study would

test the levels of pollutants over a period of six months. It is hoped that if the study shows that current separation distance standards adequately protect water quality, the program will be fully approved.

Goals four, five, and seven of the Program are interrelated. Goal four focuses on addressing problem pollutants that are listed on the 303(d) list and goal five describes the use of 319 funds at the watershed level. Goal four says we will have the controls in place to delist the waterbodies. To accomplish this, we will develop and implement Total Maximum Daily Loads (TMDLs). Goal seven says we will develop those TMDLs during the 15-year period.

To accomplish these three goals, and to make an actual positive impact on water quality, the state has begun to focus its section 319 grant resources on TMDL development and implementation. To date, about 40 NPS TMDLs (for fecal coliform) have been developed by DHEC staff. Tetra Tech, Inc., a management consulting and technical services firm, is currently developing two hundred more TMDLs (under contract). Also, four projects to implement TMDLs in specific watersheds have been awarded: Coneross Creek/Beaverdam Creek watersheds in Oconee and Pickens Counties, Bush River watershed in Newberry County, Rocky Creek in Chester County, and an unnamed tributary to the Catawba River in York County. These projects are implementing control measures in order to reduce the pollutant load, e.g., fecal coliform bacteria, to a level where state water quality standards are met (see the articles, **"TMDL, a Tool for Water Quality Improvement,"** and **"TMDL Implementation Projects Underway"**).

Goal six describes using section 319 annual grant funds to reduce and prevent NPS pollution through activities that implement regulatory, outreach, assessment, and technical assistance activities. These activities complement the Watershed Restoration Action Strategy implementation and help to insure attainment of goal three. More and more, regulatory programs at the state and local level that serve to reduce nonpoint source pollution from many sources are being put in place. For example, DHEC regulations that cover sediment, erosion control and storm water in South Carolina were recently revised (see the article titled **"State's Sediment and Erosion Control Program Broadened"**). In an effort to encourage local governments to adopt mandatory septic system maintenance requirements, DHEC OCRM developed a model inspector training program. It is explained in the article titled **"New Septic System Inspection Program Being Piloted."** Also during 2003, a certification program for contractors was initiated. It is described in the article **"The South Carolina Clear Water Contractor Program."**

Goal six also discusses the importance of outreach programs and activities. Education is a critical component of managing NPS pollution. Unless governmental agencies, educational institutions, and stakeholder groups spread the word to local communities and individual citizens about water quality problems and what works to prevent or solve those problems, people will not step forward to implement solutions. That is why education and outreach programs are critical to the success of any NPS management program. The section 319 grant funds several NPS outreach staff within DHEC, as well as funding outreach activities that are a component of specific section 319 projects. In fact, any watershed project funded through section 319 should contain an outreach component. Elsewhere in this report you will the results of some unique outreach activities

being carried out by DHEC staff and project grantees: **"New Exhibit at the SC Aquarium Informs People About Runoff Pollution," "Forestry Workshops Focus on Streamside Management Zones," "Conference Teaches Nuts and Bolts of LID"** and **"Website Helps Users Find Storm water Resources."**

Maintenance and expansion of partnerships and cooperative opportunities with stakeholders, other agencies, and citizens is the focus of goal eight. Numerous activities are currently being conducted with students, homeowners, and local governments that support this goal. In particular, federal agency support of the state's NPS Program is critical. The USDA Natural Resource Conservation Service (NRCS) has long been a partner with the state in working to improve water quality. DHEC NPS staff membership on the NRCS state Technical Committee and NRCS staff membership on the state Nonpoint Source Task Force facilitates cooperation between the two agencies. Further, DHEC and NRCS have been jointly exploring ways to focus Environmental Quality Incentive Program (EQIP) cost-share funds in watersheds where nonpoint source water quality problems occur, especially in watersheds where TMDLs are being implemented. This goal has been realized so far in one project area, the Coneross Cr./ Beaverdam Cr. watershed. The Oconee County NRCS is a partner in the project and has secured $110,000 in EQIP funds for cost share by farmers for water quality BMPs. The infusion of the additional funds will help to guarantee that all nonpoint sources in the watershed are addressed, and sufficient reduction in fecal coliform bacteria is achieved so as to allow the streams to meet water quality standards.

The focus of goal nine is to assure effective and efficient use of financial resources and to leverage funds with other programs. The state Revolving Fund (SRF) provides low-interest loans for utility infrastructure projects, usually sewage treatment facility construction. The fund can also be used to fund nonpoint source projects; however, NPS staff have promoted this funding source to local governments to implement storm water BMPs. This effort resulted in the award of three separate loans for more than $3 million to the City of Rock Hill for stream restoration/urban stormwater projects in three small watersheds within the city (see the article **"Rock Hill Chooses SRF Loans to Fund NPS Projects"**). Another municipality, Georgetown, has applied to use this funding source for a large $2 million project to control urban storm water in a coastal watershed. Currently, the application is under review.

NPS MONITORING TEAM EFFORTS SUPPORT MANAGEMENT STRATEGY

The Nonpoint Source Monitoring Team is responsible for monitoring water quality in four different areas. These areas are evaluation monitoring of section 319 grant funded projects, stations listed on the 303(d) Impaired Waterbodies List, TMDL verification studies, and enforcement cases. In addition to monitoring responsibilities, the NPS Monitoring Team also assists other SC DHEC EQC staff, as well as outside agency groups, with the development of new §319 Projects.

Section 319 Grant projects that include the installation of best management practices (BMPs) are candidates for a monitoring study to measure project effectiveness. This type of study is best

started before installation to provide a before and after look at the effectiveness of the BMP.

The 303(d) Impaired Waterbodies List is prepared by DHEC every two years. Required by the federal Clean Water Act, the list is used to provide a focus of efforts by the agency to attempt to identify sources and correct the impairment through more intensive monitoring efforts, watershed reconnaissance, and revised permit limits on dischargers. The NPS Team, in cooperation with the Watersheds and Planning Section, reviews the list and selects sites to be addressed. The type of monitoring study performed is dependent upon the impairment and the cause (if known) of the impairment. Studies are also conducted to provide additional data for the development or verification of TMDLs for impaired stream reaches.

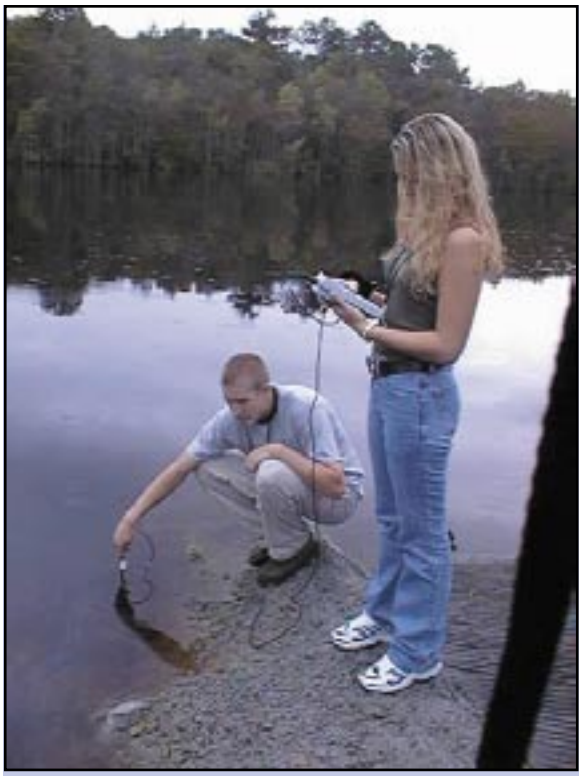
Bureau of Water Enforcement section staff receive case referrals from the DHEC Environmental Quality Control District staff. If necessary, Enforcement staff will request that the NPS Team conduct a macroinvertebrate assessment of the impacted stream. The assessment is conducted to determine the level of impact that a certain activity has had on the stream. The level of impact may be used to determine the amount of the fine that is levied on the guilty party.

NPS Team staff may also be requested to assist with outreach efforts and to help with the development of the monitoring component of new NPS projects initiated by outside entities. Staff routinely visit schools around the state to present K-12 grades with NPS-related information, as well as live macroinvertebrate exhibits, in an effort to educate the students on the importance of water quality. Staff also work with community groups and homeowners' associations in development and implementation of section 319 grant projects.

ASSESSMENT OF NPS PROBLEMS IN THE KINGSTON LAKE WATERSHED FINDS SURPRISING RESULTS

Kingston Lake and Crabtree Canal are tributary creeks that drain into the Waccamaw River. They are located near the city of Conway, SC. The Waccamaw River watershed is located in Horry County, one of the fastest growing counties in the United States. DHEC data from 1998 demonstrated that these two blackwater streams did not meet state water-quality standards for fecal coliform bacteria and levels of dissolved oxygen. High levels of fecal coliform indicated the presence of human or other animal feces in the water. Low dissolved oxygen levels can cause fish kills.

Section 319 funds were awarded in 1999 to Coastal Carolina University to determine the sources and magnitude of the bacterial contamination and low dissolved oxygen in Kingston Lake and Crabtree Creek, and to demonstrate water quality management techniques. To determine whether storm water runoff is a significant source of pathogenic bacteria and oxygen-demanding substances in the Kingston Lake subwatershed, pollutant concentrations and water flows were measured on alternate weeks and during five storm events throughout a two-year period (1999-2001). The sample sites were



located in the major tributary streams (Kingston Lake Swamp, Kingston Lake Creek and Crabtree Canal) of the subwatershed and immediately downstream in the Waccamaw River. Kingston Lake Swamp drains a rural/agricultural area that extends almost to the North Carolina state line. Crabtree Canal is a swamp channelled by the U.S. Army Corps of Engineers in the 1960s that drains the suburban outskirts of Conway. Kingston Lake Creek drains part of downtown Conway and empties into Kingston Lake. Many other storm water runoff pipes drain other sections of downtown Conway and empty directly into the Waccamaw River. By sampling at these sites, the impact of the tributary flows on the river's water quality was assessed.

Storm water runoff caused elevations in the levels of suspended solids, bacteria, oxygen-demanding substances (BOD5), nutrients (nitrogen and phosphorus) and chlorophyll (a plant pigment used to measure algal abundance) at all the sampling sites. Concentrations exceeding state and federal water quality criteria were frequently observed. Even during periods without rain, relatively high levels of these contaminants were observed. Pollution observed during dry weather flows reflects slower but chronic releases from contaminated soils, roads, roofs, agricultural fields and livestock operations.

These observations suggest that nonpoint source pollution, as transported by storm water flows, is a significant and persistent problem in the Kingston Lake subwatershed. The impact of this pollution was not as great in the main stem of the river located immediately below the subwatershed due to dilution from upstream river water. Nevertheless, the effect of storm water runoff was observable following rain events in the form of moderately elevated levels of pollution in the Waccamaw River itself.

In the case of bacteria, fecal coliform concentrations correlated well with the two other indicator species, E. coli and Enterococcus. This provided abundant confirmation of chronic pollution problems at all the sampling sites. Frequent exceedances of swimming criteria were observed even in the absence of rain. These exceedances tended to be extremely high immediately following rain events, with concentrations often rising over 100,000 colony forming units (CFUs) per 100 mL.

Laboratory culture studies indicate that river water is not hospitable to these bacteria, as their numbers declined below detection within two days. While these bacteria do not appear to survive in river water, they do appear to have settled into the sediments and formed viable colonies at some locations. Boat wake has the potential to re-suspend these bacteria, leading to elevated levels in the river.

The results of multiple antibiotic resistance (MAR) testing indicated that humans and domesticated animals were as important as wildlife in contributing to the high concentrations of contaminant bacteria observed at all the sites. The human sources were likely associated with broken sewer lines and leaking septic tanks.

Estimates of fecal coliform production rates based on populations of wildlife, pets, livestock and emissions from septic tanks and sewage treatment plants indicated that native waterfowl are the largest producers of fecal coliform in the watershed. Dogs and cats are secondary in importance. Wildlife has been observed as a significant source of contaminant bacteria in many other communities. These

findings are particularly frustrating, as the sources appear to be "natural." On the other hand, these results suggest the importance of maintaining pervious surfaces in the watershed to sustain natural soil filtration and purification processes. This should also help preserve adequate habitat so that wildlife densities remain close to "natural" levels and do not overwhelm natural purification capacities.

Sewage is composed of bacteria and organic wastes, so it was not surprising that elevated levels of suspended solids and oxygen-demanding substances (BOD5) were also observed (some of the BOD5 may also have been associated with eroded soils). Dissolved oxygen deficits can lead to fish kills, so SC DHEC limits discharge of these substances from point sources, including the City of Conway's sewage treatment plant. At present, this plant is allowed to discharge 303 pounds of oxygen-demanding substances per day. During the 24-hour period following a typical rain event, the amount of oxygen-demanding substances emitted via non-point source runoff from the tributary creeks was nine to eighteen times higher than the permitted discharge from the sewage treatment plant. Scaled up to an annual basis, the nonpoint source levels are greater than three to six times the quantity permitted from the sewage treatment plant.

Nutrient levels (nitrogen and phosphorus) were not elevated to as great an extent as the other contaminants, but elevated chlorophyll concentrations were observed that exceed the suggested federal standards. Chlorophyll is a green pigment produced by algae. Thus, it appears that the nutrients supplied by the decomposition of sewage or by fertilizer runoff were rapidly consumed by algae. This sequence of events is the beginning of a problematic syndrome called eutrophication. Once algae or their consumers die, bacterial decomposition of their organic remains further lowers the dissolved oxygen levels of the water. The resulting oxygen deficits can be severe enough to cause a fish kill.

Point-source dischargers, including industry and sewage treatment plants, are unlikely to be the major source of pollutants to the Waccamaw watershed because of their limited numbers. This project demonstrated that non-point sources are the most significant source of the observed quality impairments in waters around the city of Conway. Given the projected population growth of Horry County, these non-point sources are also likely to increase and thereby expand water-quality problems throughout the watershed unless measures, such as storm water best management practices (BMPs), are adopted.

SOUTH CAROLINIANS STILL CLOUDY ON RUNOFF BEHAVIORS

Runoff pollution isn't just found on the mismanaged farm or the draining off of denuded construction sites. It's also part of the everyday suburban and urban landscape. Over-fertilized lawns, pet waste left on streets and sidewalks, carelessly discarded home and garden products, and leaking motor oil all add to the slurry of contaminants that wash into urban and suburban creeks and streams each time it rains. Preventing runoff pollution in South Carolina starts at home. What do South Carolina citizens really know about runoff pollution and how they contribute to it?

A recent survey on the public's perception of runoff pollution and behaviors related to it, commissioned by the SC DHEC's Bureau of Water's Outreach Program, found that while most South Carolinians generally agree that activities on land impact water quality, they are less knowledgeable about the specific actions that might have an impact on water quality. Interestingly, women were more likely than men to believe that what people do on land affects nearby waterways.

Public perception on the role of trees and shrubs in protecting water quality was high, with 87% of survey respondents believing that trees and shrubs had something to do with protecting water quality. However, South Carolinians still don't have the broad awareness that runoff pollution is a bigger problem for water quality than point source discharges, as only 25% believed that runoff pollution was a bigger problem. Also, the connection between storm drains and waterways is still weak, with only 28% of respondents aware that storm water runoff is generally not treated before it reaches a river or stream.

In addition to their perceptions of storm water runoff pollution and awareness of factors that contribute to it, respondents were asked about behaviors related to runoff pollution, including use of fertilizers, disposal of yard clippings, use of pesticides, ownership of septic system, and cleaning up of pet waste. For example, survey results indicate that most South Carolinians agreed that regular inspections and clean out of septic tanks protects water quality. Yet, of those that had a septic tank, less than half had ever gotten any advice on how to maintain their septic system and less than half had their system inspected within the last two years. Fifty-two percent of respondents compost yard clippings, while the remainder rely on everything from curbside pick-ups to burning. Close to a third of South Carolinians say they dispose of household hazardous products, such as paints, cleaners and varnishes, in the trash, while 25% take them to be recycled and 22% take them to the landfill.

About half of South Carolina adults own a dog and 78% of respondents agreed that pet waste is a source of bacteria in local waterways. Of those dog owners surveyed, slightly more than 25% claim they always pick up pet waste on their property and a similar number claim they never clean up after their dog. Forty-three percent of those owners report cleaning up dog waste on walks all of the time, and 23% never clean up after their dog on walks. Eighty percent said that a law or ordinance requiring clean up would make it more likely that they would do so. A similar percentage said a $50 fine would increase the likelihood that they would pick up dog waste. Three-fourths said having a simple sanitary method of pet waste disposal would increase the likelihood that they would clean up after their dogs.

The survey also asked South Carolinians about their preferred method of receiving information about water quality protection. Public service announcements were the number one choice. Surprisingly, a mailed brochure was the second highest rated method and community newsletter or free videos came in third. Less popular were local newspapers, public access cable shows, Internet, and radio call-in shows.

DHEC will use these survey results to make adjustments to current runoff pollution outreach efforts and to plan future water quality education initiatives. In addition, communities and municipalities

affected by the Phase II storm water rule can use these results to assist them in their public outreach and education program planning.

Survey results can be viewed on the Web at *www.scdhec.gov/water/ms4/index.html*. Click on *DHEC's Survey of Public Awareness of Runoff Pollution.*

SOUTH CAROLINA'S COASTAL NONPOINT POLLUTION CONTROL PROGRAM

The revised NPS Management Program plan incorporates South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP), under section 6217 of the Coastal Zone Act Reauthorization Amendments, with the components of the program required under section 319 of the Clean Water Act. The purpose of the CNPCP is to address nonpoint source pollution issues within the coastal zone and, subsequently, to ensure that all applicable management measures are implemented to protect and restore the state's coastal resources.

The National Oceanic and Atmospheric Administration (NOAA), in April of 2001, approved the State's CNPCP with one remaining condition. That condition relates to the vertical separation distance between an onsite sewage disposal system's drain field and the seasonal high water table. South Carolina continues to address this issue and is actively working to satisfy the remaining requirements needed for full program approval by NOAA and the EPA.

DHEC's Office of Ocean and Coastal Resource Management prepared a 15-year strategy for the CNPCP, which describes general objectives for the comprehensive and effective management of polluted runoff within the coastal zone. The 15-year strategy utilizes three types of programs to meet these objectives: regulatory programs, voluntary incentive-based programs, and watershed level planning projects. Within the context of the broader 15-year strategy, detailed 5-year plans address specific goals and strategies for program implementation. The 5-year plans focus on several coastal NPS categories, which

include agriculture, forestry, urban areas, marinas and recreational boating, hydromodification, monitoring and tracking, public education and outreach, and wetlands. OCRM recently drafted the 5-year plan for 2003 to 2008, which will continue to reflect the shift in focus from program development to implementation of management measures. The geographic priority region for this second phase includes the coastal counties of Colleton, Georgetown, Horry and Jasper.

The CNPCP continues to support ongoing projects such as the Clean Marina Program, the South Carolina Estuarine and Coastal Assessment Program (SCECAP) and South Carolina Nonpoint Education for Municipal Officials (NEMO). By supporting these programs, the CNPCP fosters effective partnerships with other agencies and organizations working towards the common goal of protecting coastal resources. In addition, the CNPCP sponsors voluntary educational workshops addressing Best Management Practice (BMP) implementation for a variety of coastal NPS issues.

TMDL, A TOOL FOR WATER QUALITY IMPROVEMENT

The passage of the Federal Clean Water Act laid the groundwork for improving water quality in all of the nation's water bodies. An important part of that groundwork is contained in section 303(d) of the Act. Section 303(d) requires that in every even-numbered year, each state will produce a list of impaired waters based on findings from water quality monitoring data. The monitoring data is compared with state water quality standards that specify criteria for the protection of human health and aquatic life, such as fecal coliform bacteria, heavy metals, dissolved oxygen, and turbidity. If the water quality standard is exceeded during the review period, a water body is considered impaired and is placed on the 303(d) list. Once on the list, TMDLs (Total Maximum Daily Loads) must be developed for these impaired waters.

In EPA-speak, a TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. TMDLs for a water body are calculated based on point source wasteload allocations (industrial discharges, wastewater treatment discharges, etc.), nonpoint sources (pollutants from runoff), natural background sources such as wildlife, and a margin of safety. TMDLs are developed for each pollutant causing impairment to a water body. Therefore, a water body may have multiple TMDLs if it is impaired by more than one pollutant.

An example used by the Volunteer Monitor publication compares a TMDL to a pie. The pie is the maximum pollutant a water body can handle and the slices are the contributing factors. The slices can vary in size and number depending on the land uses of the watershed that is analyzed for the TMDL.

In South Carolina, the overwhelming majority of impairments to the state's surface waters, as listed on the 303(d) list, are due to fecal coliform bacteria. These are almost invariably due to nonpoint sources, since all point source dischargers are required to disinfect their effluent. The development of a TMDL involves assessment

to determine the characteristics of the impairment. Under what conditions do exceedences of the water quality standard occur: after rain events, under low flow conditions, or perhaps only during hot weather? Answers to these questions will help point to the sources of the impairment. For waters impaired by pathogens (e.g., fecal coliform bacteria), the sources are typically failing septic systems, cattle with access to streams, runoff from improperly applied manure, leaking or over-flowing sanitary sewers, and runoff from urbanized land. A computer model or another method, such as load-duration curves, is used to determine the existing load of pollutant and the Load Allocation (LA) or quantity of pollutant allowed from nonpoint sources for the TMDL.

Before the TMDL is submitted to the EPA for approval, the public is given an opportunity to comment on it. The TMDL document is posted on the DHEC Web site (*www.scdhec.gov/water/html/tmdlsc.html*) and the public is notified of its availability through a mailing and legal notice in a local newspaper. Subsequent to the public notice period, the TMDL is submitted to the EPA for review and approval. Once approved, the TMDL becomes eligible for implementation. The accompanying table provides a list of the 60 approved South Carolina TMDLs as of October 2003. The list is constantly growing as more and more TMDLs are approved.

An approved TMDL also establishes the available wasteload allocations for point sources. Permits for NPDES facilities (point sources) and NPDES storm water permits must be consistent with any TMDL that applies. DHEC generally does not have regulatory authority over control nonpoint sources. Rather, control of nonpoint sources is encouraged by using 319 grants, USDA cost share programs, etc. to encourage landowners, farmers, and interested citizens to voluntarily work to improve water quality.

Once the TMDL has been developed, the next step is implementation. At this point, the TMDL can be used to formulate a strategy to reduce the pollutant loading through best management practices in the watershed and stream restoration projects. It is important to note that watershed stakeholders play a major role in realizing source reductions as TMDLs are implemented.

In response to the EPA's section 319 national guidance, more and more federal nonpoint source funds are being allocated for the development and implementation of TMDLs. In South Carolina, Section 319 nonpoint source dollars are now available primarily for TMDL implementation. To date, four TMDL implementation projects are underway in watersheds around the state.

List of Approved TMDLs, October 2003

Waterbody	Parameter	Sampling Locations (each sampling station represents a TMDL)
	Dissolved Oxygen	
AIWW-Waccamaw River		MD-110, MD-111, MD-136, MD-127, MD-089, MD-088, MD-146, MD-137, MD-087, MD-085, MD-091, MD-125
Coosawhatchie R-Sanders Br		CSTL-011, CSTL-109
Cooper River-Wando River Charleston Harbor		MD-115
Ashley River		CSTL-102, MD-049
	Fecal Coliform	
Beaverdam Creek		SV-345
Beaverdam Creek		CW-153
Brown Creek		CW-105
Brushy Creek		BE-009, BE-035
Bush River		S-046, S-102
Camp Creek		CW-235
Cane Creek		CW-017, CW-047, CW-131, CW-151, CW-185
Catawba River-Rocky Creek		CW-002, CW-174, CW-175, CW-236
Catawba River Tributary		CW-221
Cedar Creek		B-320
Coneross Creek		SV-333 & SV-004
Fishing Creek		CW-005, CW-008, CW-029, CW-224, CW-225, CW-233
Grassy Run Branch		CW-088
Hanging Rock - Lick Creek		PD-328, PD-329
Little Eastatoe Creek		SV-341
Middle Tyger River		B-148
Mill Creek		S-315
Neelys Creek		CW-227
Rawls Creek		S-287
Sawmill Branch-Dorchester Creek		CSTL-013, CSTL-043
Sawneys Creek		CW-079, CW-228
Tinkers Creek		CW-234
Tools Fork Creek		CW-212
Wildcat Creek		CW-006, CW-096
	Phosphorus & pH	
Lake Edgar Brown		CL-064

TMDL IMPLEMENTATION PROJECTS UNDERWAY

Four projects in five watersheds that implement 10 TMDLs are currently underway around the state. Summaries of these projects follow.

BUSH RIVER TMDL IMPLEMENTATION PROJECT

Lead Organization: Newberry Soil and Water Conservation District

Introduction: Bush River has been placed on South Carolina's 2000 303(d) list of impaired water bodies because of violations of the fecal coliform bacteria water quality standard. This TMDL project begins the process of implementing measures that will ultimately result in achievement of fecal coliform bacteria standards in Bush River.

Objectives: The goal of this project will be to reduce the instream fecal coliform bacteria load by 15 to 17 percent in this watershed so the fecal coliform standards will be met.

Methods: The project will develop and implement 75 resource management plans that include treatment of 1000 acres of sensitive cropland and pastureland near streams and water bodies. The project will target concentrated animal operations, non-confined animal operations, and individual homeowners.

Outputs: Planning, developing and applying nutrient management and manure storage systems will reduce NPS pollution from concentrated animal operations. It is anticipated that the fecal coliform loading from this source will be reduced by 75 percent.

Impairments from grazing animals will be treated by developing grazing management systems that focus on protecting the riparian zone. Means to limit or prevent the pollutant from entering these areas will be planned and installed. It is anticipated that the fecal coliform loading from this source will be reduced by 50 percent.

CATAWBA RIVER TRIBUTARY FECAL COLIFORM REDUCTION PROJECT

Lead Organization: City of Rock Hill, South Carolina

Introduction: The Fecal Coliform Reduction Project for the Catawba River Tributary was developed to meet the 19% reduction of fecal coliform bacteria in the creek as required by the TMDL. The tributary's watershed is characterized in the 1999 DHEC TMDL document as "developed residential and commercial" and is served by sanitary sewer. The document states that nonpoint sources are believed to be the source of fecal coliform bacteria in this watershed.

Objectives: The project consists of three primary components to be implemented within the drainage area as follows: 1) an illicit discharge identification project, 2) the design and construction of storm water run-off treatment BMPs, and 3) a public education/participation program.

Methods: The project incorporates a combination of source controls and treatment methodology. The proposed project includes an illicit discharge identification project throughout the drainage area; fecal coliform storm water data collection during two (2) storm events with samples collected in the tributary, its side streams, and from commercial parking lots; selection, design and construction of stormwater run-off treatment Best Management Practices (BMPs) within commercial parking lots; and a public education/participation program focused on residential pet waste management.

Outputs: The project includes multiple outputs including source identification, quantification, and verification through both the wet weather and dry weather sampling within the drainage area. The data will form the basis for the elimination of illicit connections and for storm water treatment design components of the project. The construction project will include structural BMPs designed to treat parking lot runoff for bacteria removal. Area residents will be presented with educational material on non-point source pollution with an emphasis on pet waste management. The “unnamed tributary” will be given an official name and visibly placarded to promote and maintain public awareness. Progress and results of all project components will be documented in an interim report and a final report.

Outcomes: Implementation of the TMDL within the scope of the proposed project is expected to reduce the geometric mean values of fecal coliform concentrations in the tributary by at least 19 % as measured monthly by continued water quality sampling by DHEC at Station CW-221. The project will result in documented illicit discharge identifications and verification of the disconnections within the drainage area. The local public will become aware of the tributary, associated bacteria TMDL, and be introduced to water quality benefits of proper pet waste management.

IMPLEMENTATION OF A TMDL IN ROCKY CREEK AND THE CATAWBA RIVER AT GREATFALLS, SC

Lead Organization: Research Planning, Inc.

Project Description: The Rocky Creek and Catawba River areas (HUAs 03050103-090, 03050103-010) violated the fecal coliform bacteria water quality standard, and were placed on the 303(d) list. A Total Maximum Daily Load (TMDL) has since been developed for this area. In order for streams in the watershed to meet the standard for fecal coliform bacteria, the fecal coliform load must be reduced by 83 to 84 percent.

Objectives: The main goal of this project is to educate local landowners on sources of fecal coliform loading into the watershed, and to implement Best Management Practices (BMPs) in the watershed in an effort to lower fecal coliform bacteria loadings to a level that would comply with the TMDL. The water body would then qualify for designated recreational uses.

Methods: A combination of local knowledge and spatial data analysis will be used to identify potential sites contributing to NPS loading of fecal coliform bacteria in the watershed. We intend to characterize and prioritize candidate sites using local knowledge and observations of current management practices. The suitability and likely costs

for implementing BMPs will be evaluated at selected sites, with the objective of having the best benefit to water quality relative to the costs. The selected BMPs will be implemented at the selected sites.

Outputs: The emphasis for this project will be on implementing BMPs on agricultural lands used for the raising of livestock, and in the urban and rural areas where failing septic systems, improper storm drainage, pets, etc. may be NPS pollution contributors. We also intend to educate the community on BMPs that they can implement on their own. In addition, we will work with land owners to implement specific water quality BMPs that will reduce fecal coliform contamination using cost share funds.

Outcomes: 1) A significant improvement in water quality, in terms of reduced fecal coliform bacteria levels measured at SC DHEC sampling stations in post-project water samples, 2) increased participation rates in NPS control measures by landowners in the watershed, and 3) increased community and public awareness of water quality problems and solutions in the watershed.

TMDL IMPLEMENTATION UNDERWAY IN CONEROSS CREEK/ BEAVERDAM CREEK WATERSHEDS

Lead Organization: Clemson Cooperative Extension Service

Introduction: Funded through a section 319 grant from the EPA, a new effort to combat bacterial pollution in two adjacent watersheds in Oconee County began in December 2002. Acting as the lead organization, the Clemson Cooperative Extension Service (CES) and its partners, the Oconee County Soil and Water Conservation District and the County NRCS, have initiated a two-year project that promises to implement bacteria runoff control measures in critical areas throughout the watershed.

Objective: Reductions in fecal coliform bacteria were called for in Coneross Creek and Beaverdam Creek. Total Maximum Daily Loads for the two streams in these adjacent watersheds were developed by DHEC in 1999 and 2000, respectively. If successful, this implementation project will result in improved water quality and consistent attainment of water quality standards for fecal coliform bacteria (FC). Two DHEC monitoring stations in the Beaverdam Creek watershed showed that state standards for FC were chronically exceeded and that the load would need to be reduced by over 50% to meet the standard. An approximate 50% reduction is also needed in the Coneross Creek watershed to meet FC standards there.

Outcomes: To correct this problem and meet the TMDLs, the project sponsor will implement a combination of BMPs on a watershed scale that includes detailed waste and grazing management procedures, engineered BMPs focusing on riparian zones, septic system upgrades including constructed wetlands, and an extensive educational campaign targeted towards homeowners. Clemson CES has recruited a number of partners in this effort, including the USDA Natural Resources Conservation Service, Oconee Co. Soil and Water Conservation District, Oconee Co. Beef Cattlemen's Association and the DHEC Oconee Co. Health Dept. Additional funding was also secured for the project using USDA EQIP cost share funds.

The Beaverdam Creek/Coneross Creek TMDL Project, using the diverse expertise available in this partnership, should result in demonstrable improvement to water quality in these watersheds.

STATE'S EROSION AND SEDIMENT CONTROL PROGRAM BROADENED

South Carolina's Sediment, Erosion, and Storm water Management Program has been in existence since 1983. Originally, only state-owned or state-managed lands were required to control sediment or erosion during construction. In 1991, however, the program was expanded to include most all land disturbances greater than two acres. State law and regulation require submission of site plans showing controls and, except for SC Department of Transportation projects, a written approval on projects with more than two-acre disturbances. This approval must be granted before land disturbing activities can commence, unless the site is exempt from regulation. Each year, approximately 550 approvals are issued for land disturbance projects. Another 750 to 800 sites are exempted each year because their size is two acres or less.

DHEC's Bureau of Water is responsible for administering the Sediment, Erosion, and Storm water Management Program. The Bureau may delegate this program to a local entity upon their request. Further, DHEC's Office of Oceans and Coastal Resource Management (OCRM) oversees this program in the eight coastal counties. Their responsibilities include plan reviews, site inspections and enforcement activities when a local entity is not delegated.

The Industrial, Agricultural, and Storm water Permitting Division within the Bureau of Water is responsible for the permitting aspects of projects in all areas of the state that are not delegated. The DHEC Environmental Quality Control (EQC) offices are responsible for the fieldwork associated with the Sediment, Erosion, and Storm water Management Program. This includes construction site inspections and complaint investigations to ensure that all land-disturbing activities are performed according to the approved plans. Enforcement actions may be used by the Bureau when necessary to ensure proper approvals are obtained and to ensure compliance with these approved site plans.

This program overlaps with the Storm water NPDES Permit Program since most sites that disturb more than two acres must have permits under both programs. The Bureau of Water, the EQC District Offices, and OCRM coordinate both the state and federal permit activities (permitting, compliance, monitoring, and enforcement) to ensure overlap is minimized. Further, the Sediment, Erosion, and Storm water Management Program and the NPDES Storm water Program (Municipal Separate Storm Sewer Systems—MS4s—and Storm water Discharges Associated with Industrial Activity) are integrated into a comprehensive Storm water Regulatory Program for the state.

NEW SEPTIC SYSTEM INSPECTOR PROGRAM BEING PILOTED

DHEC's Office of Ocean and Coastal Resource Management (OCRM) is developing a pilot program for the eight coastal counties to train people to inspect onsite septic systems. This is being done, in part, to obtain federal approval of South Carolina's Coastal Nonpoint Source Pollution Control Program (CNPCP). The CNPCP requires that onsite systems be properly maintained. Routine inspection of OSDS systems would help with finding and correcting any problems with the system.

Since the state has neither the regulations nor the resources to require inspections, OCRM is working to develop tools that will assist local governments or other entities in managing septic systems. One of these projects is the Section 319-funded Onsite Septic System Inspector Training Pilot Program.

Phase one of the pilot program involved conducting a feasibility study to determine if stakeholder groups were interested enough to use trained inspectors, and to explore the logistics of developing a training program. To determine the level of interest, a survey was conducted and two-thirds of the survey respondents said they saw a need for a standardized inspector training program. Almost that many said they would consider requiring inspections if trained inspectors were available. The entire feasibility study report can be found on the DHEC OCRM Web site, *www.scdhec.gov/ocrm/*, under "Publications."

Two-day training courses were held in three locations during 2003, in Horry, Charleston, and Beaufort counties. The thirty participants, who included home inspectors, septic system installers, and local government staff learned the theory of how a septic system works and how to spot and correct operation problems. The courses were taught jointly by Clemson University Extension and DHEC's Onsite Wastewater Management Branch.

THE SOUTH CAROLINA CLEAR WATER CONTRACTOR PROGRAM

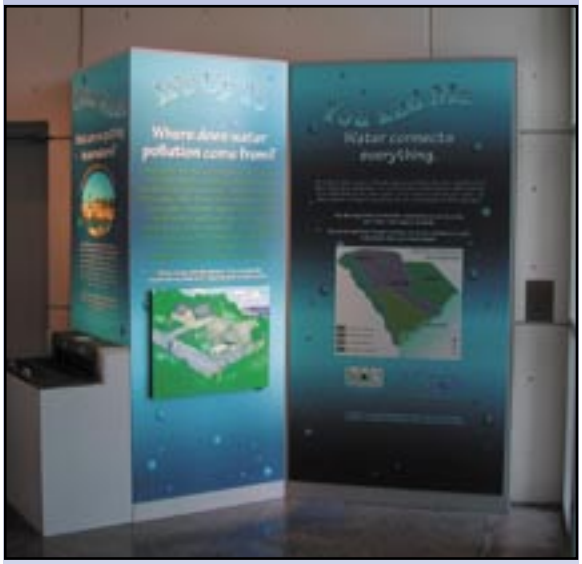
Construction and land disturbing activities have the potential to adversely affect water quality in South Carolina waterways. Sediment and soil erosion impacts are an altogether too common type of nonpoint source pollution and can be particularly troublesome in rapidly developing areas. The South Carolina Storm water Management and Sediment Reduction Act of 1991 (SMSR) regulates most land disturbing activities in our state. While the SMSR has undoubtedly improved sediment and erosion control planning, the on-site installation and maintenance of sediment and erosion control best management practices such as silt fencing, rock check dams, and inlet protection are where "the rubber meets the road" in protecting waters from sediment impacts.

Through a partnership of DHEC's Office of Ocean and Coastal Resource Management, the South Carolina Sea Grant Consortium, and Clemson Extension, a program about the proper installation, situating, and maintenance of sediment and erosion control practices is being implemented. The first South Carolina Clear Water

Contractor (CWC) Workshop, held in Greenville on March 20, 2003, brought sediment and erosion control information and education to people who have the most direct influence on sediment and soil erosion impact reduction: general contractors, paving and grading contractors, bulldozer operators, excavators and others involved in land disturbance.

Upon completion of the one-day course, which includes a final exam, each "graduating" attendee attained the status of a South Carolina Clear Water Contractor, and is allowed to use the program's logo to demonstrate their commitment to quality site development and South Carolina's waterways. Following this initial workshop, which was sponsored by the Greenville Soil and Water Conservation District, the program will expand across the state thanks to the involvement of South Carolina's Sea Grant Consortium and Clemson Extension.

NEW EXHIBIT AT THE SOUTH CAROLINA AQUARIUM FOCUSES ON RUNOFF



A new exhibit, partially funded through a section 319 nonpoint source grant, has been added to the exhibit path at the South Carolina Aquarium in Charleston. According to Whit McMillan, Conservation Education Manager at the Aquarium, "We would like to make sure that our visitors leave with an understanding of how their actions affect the state's water." Studies have shown that many people don't always make the connection between their everyday actions and the health of the water where they swim, boat or fish.

The exhibit, the result of a partnership between DHEC, the Aquarium and the city of Charleston, is designed to showcase water quality in an interactive way and for families to use as a learning tool. The introductory panel of the three-part exhibit features a model of a storm drain and asks visitors to choose what they would put "down the drain." The results of the choice are shown underneath as either a healthy marsh system with animal life, or a polluted one.

The second panel depicts a fictional neighborhood and challenges the viewer to help the neighborhood residents pollute less. The large artwork panel opens to reveal hints to help everyone pictured change their behaviors. "The panel is focused on positive day-to-day actions that everyone could take at their home," states McMillan. The final panel is designed to show how water connects regions of our state. Visitors are asked to find their watershed on a map. The text focuses on the idea that no matter where you live, your actions affect others.

Initial responses to the exhibit have been very positive, and the interactive sections are attractive to children. Since the new exhibit is located near the Discovery Lab and the extremely popular "touch tank," it is one of the prime spots for family learning in the Aquarium. Partnerships such as this one are one example of creative ways to help large numbers of people understand water quality issues in our state.

FORESTRY WORKSHOPS FOCUS ON STREAMSIDE MANAGEMENT ZONES

In South Carolina, a new series of workshops is helping professional loggers understand the potential sources of nonpoint source pollution from harvesting operations. The instructors outline the scientific importance of protecting streamside management zones (SMZs), which includes SMZ planning, management, and layout techniques. The workshops also offer a forum for asking questions and interacting with the SC Forestry Commission BMP foresters who monitor the voluntary forestry BMPs for South Carolina. The workshops are presented by the SC Forestry Commission in collaboration with Clemson University Department of Forest Resources, and are funded through a section 319 grant.

The majority of the participants are loggers, although procurement foresters, contractors for site preparation/road construction/tree planting, consulting foresters, and landowners are also benefiting. While the four-hour classroom session offers a detailed overview, it is the field trip that sets everything into perspective for the participants. The participants are divided into four groups. Each group is required to assess stream types and flag the primary and secondary SMZs boundaries. This exercise creates open discussion and debate on problems and issues encountered during harvesting operations.

Along with protecting water quality, the class comes to appreciate other benefits of SMZs, such as the protection of aquatic organisms and provision of wildlife corridors. Students also learn about minimum soil disturbance within SMZs, and get information about threatened and endangered species and sensitive areas.

To date, over 500 forest operations professionals have attended the 16 workshops held around the state. Evaluations rate the workshop consistently near the “outstanding” category, with an average of 1.17 out of a scale of 1 (outstanding) to 4 (poor). When asked if they work in a water quality priority watershed, 84 percent (246 of 293 respondents) answered “yes.” Almost 96 percent of 317 respondents answered that they would recommend the course to others.

Through understanding and participation, attitudes are changing to improve water quality and protect sensitive woodland areas in South Carolina.

CONFERENCE TEACHES NUTS AND BOLTS OF LID

Low Impact Development (LID) is a comprehensive, technology-based approach to managing urban storm water. This approach combines a hydrologically functional site design with pollution prevention measures to compensate for land development impacts on hydrology and water quality. Storm water is managed in small, cost-effective landscape features located on each lot, rather than being conveyed and managed in large, costly pond facilities located at the bottom of drainage areas. This unique micro-management source control concept is quite different from conventional end-of-pipe treatment or conservation techniques. LID techniques include pervious pavement,

bioretention, filter strips, vegetated buffers, grassed swales, rain gardens, and roof gardens.

LID technology is seen as a solution for controlling and reducing storm water runoff and protecting water quality in urban settings. In an effort to educate developers, local government staff, land use planners, storm water managers, and other environmental professionals about LID, DHEC and several other organizations recently sponsored a two-day conference in Columbia, South Carolina. Around 180 participants listened to speakers that included Neil Weinstein of the Low Impact Development Center in Beltsville, Maryland and Larry Coffman of Maryland's Department of Environmental Resources, who discussed LID philosophy, principles, and design approaches. The second day's session included workshops on the practical application of the technology.

WEB SITE HELPS USERS FIND STORMWATER OUTREACH RESOURCES

New EPA storm water rules are requiring many of South Carolina's cities and towns to implement public outreach and education programs as part of their local efforts to reduce pollutants in storm water runoff. To help these communities with their public outreach and education efforts, DHEC's Runoff Pollution Outreach program has developed a Web site that includes state and national links to resources, materials, programs and other useful information. This Web site is called Outreach Resources for Phase II Stormwater.

The Web pages link users with sites on South Carolina-specific programs like SC NEMO (Nonpoint Source Education for Municipal Officials), Carolina Clear, and Home-A-Syst. Users can also link to sites on storm water curriculum, nationally available resources, DHEC storm water outreach resources, and the results of DHEC's Public Awareness Runoff Pollution Survey. The Outreach Resources Web site is located at *www.scdhec.gov/water/ms4/index.html*.

ROCK HILL CHOOSES SRF LOAN TO FUND NPS PROJECTS

Rock Hill, a city situated about 25 miles south of Charlotte, has an area of almost thirty-two square miles and an urban population of about fifty-two thousand. About six years ago, the City Council established a Storm water Division under the Utility Department, which is funded by storm water fees imposed on city residences and businesses. The division has a budget of over one million dollars, which goes toward operation, maintenance and professional services.

Back in July 2000, the City Council requested that the Storm water Division come up with at least $5 million dollars worth of capital projects for water quality improvement. In turn, the Division proposed six projects estimated at $7.5 million. The Division evaluated general obligation bonds, increasing storm water fees, and various grants as a means of financing. About that time, while attending a SC Association of Storm water Managers meeting, the Division first

heard about the State Revolving Fund (SRF) as a long-term funding source. The SRF had many advantages, such as a very favorable interest rate and no payback until construction is completed, which fit the Division's needs. Compared to general obligation bonds, the SRF was more economical when water quality BMPs (Best Management Practices) were included in the costs. With the EPA's NPDES Phase II Stormwater Permits on the horizon, the SRF was a great way for the city to start looking at water quality requirements while completing major drainage improvements.

Subsequently, Rock Hill has applied for three separate SRF loans to do stream restoration projects in three small watersheds within the city limits. The Little Dutchman Creek project will implement stream restoration techniques (stream bank stabilization, riparian buffers, and bioengineering) on 4,200 feet of the stream at a cost of more than $350,000. The Ebinport Road project will use stream restoration techniques and water quality BMPs (such as water quality ponds, storm water filters, and porous pavers in a parking lot) on 1465 feet of stream at a cost of $2.24 million. The Sumter Avenue project will provide stream restoration, water quality BMPs, and storm water drainage improvements on 5,100 feet of stream at a cost of $1.7 million.

The loans were approved by DHEC and the Budget and Control Board in the summer of 2002, and Rock Hill has begun construction on the projects. Rock Hill is the first governmental entity to take advantage of SRF funds for NPS projects in the southeast.

FOCUS FOR THE FUTURE

As can be seen in this report, South Carolina has made significant progress toward attaining the goals set forth in its NPS Management Program. However, the state will soon be able to show measurable water quality improvement in many of its waterbodies impacted by runoff pollution. Beginning in 2002, and for the foreseeable future, most section 319 grant program resources will be focused on implementing Total Maximum Daily Loads in watersheds where TMDLs have been developed. By definition, these efforts will reduce the pollutant load to a level that meets the state standard for that pollutant, thus meeting one of the most important goals of the NPS Management Program. Four TMDL implementation projects implementing 10 fecal coliform TMDLs are currently underway, and many more will commence shortly as more and more TMDLs are developed. Money becomes the limiting factor however, and the challenge arises to find the financial resources to continue the implementation projects at the needed level. Efforts will continue to build capacity, including seeking USDA NRCS funding through EQIP.

Fixing NPS problems in South Carolina's coastal watersheds is an ongoing challenge because of the sensitive ecosystems that are so easily damaged by pollution and because of the tremendous growth and development that is occurring in the coastal counties. The state has prepared what it believes to be an effective and implementable Coastal Nonpoint Pollution Control Program under section 6217 of the Coastal Zone Act Reauthorization Amendments. The current challenge is to receive full approval of the state's program. It is hoped that the EPA and NOAA will fully approve the CNPCP in 2004, so that

it can continue to be implemented.

Beginning in March 2003, the SC Municipal Stormwater Separate Sewer System (MS4) permit program was expanded to include an additional 50 to 60 urban jurisdictions. The larger jurisdictions of Richland and Greenville counties, which include the cities of Columbia and Greenville, already had permits. This means that most of the state's medium sized towns and other urban places (50,000 to 100,000 population) are required to implement a stormwater permit issued to them by DHEC. Under the terms of the permit, urban stormwater pollution must be addressed through source monitoring, BMP implementation, and public education. It is anticipated that implementation of these requirements will dramatically reduce runoff pollution from urban sources statewide.

Passage of the US Department of Agriculture Farm Bill in 2002 includes a provision to greatly expand conservation and land retirement programs and emphasizes on-farm environmental practices. Specifically, the new law greatly increases funding for the Natural Resources Conservation Service Environmental Quality Incentive Program (EQIP) over the next five years ($700 million nationally in FY 2003, $1.0 billion in FY 2004, $1.2 billion in FY 2005 and 2006, and $1.3 billion in FY 2007). The purpose of the EQIP program is to cost share with producers so they can implement water quality BMPs on their farms. These expanded programs will undoubtedly help to reduce nonpoint source impacts due to agriculturally related activities. The SC NPS Management Program cooperates closely with the NRCS and other USDA agencies, and pledges to continue cooperative efforts.

South Carolina clearly understands that it is imperative to show quantifiable improvements in water quality and reduction of nonpoint source loads as a result of NPS program implementation, especially section 319 funding. Several mechanisms are in place or will soon be implemented that will result in ways to yield hard data. Results reporting is a requirement of all section 319 funded projects. Beginning in FY 2003, the Grants Reporting Tracking System (GRTS) that DHEC uses to report to the EPA includes new features that make it feasible to report quantifiable reductions in pollutant loads. South Carolina is making full use of these new features. Also, the focus of funding resources on TMDL implementation will produce measurable water quality improvements in the state's water bodies.

South Carolina intends to build upon its successful NPS management program, always seeking additional resources and technology to reduce nonpoint source pollution in the state's waterways so that the mission of the DHEC Bureau of Water may be realized: *"Our mission is to ensure that all water resources of South Carolina are of a quality suitable for use by all citizens and that all surface waters are of a quality suitable to support and maintain aquatic flora and fauna."*

SOUTH CAROLINA NONPOINT SOURCE PROGRAM CONTACTS

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A report by the South Carolina Department of Health and Environmental Control on progress toward meeting the goals of the State Nonpoint Source Management Program.

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